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COAL RESOURCE OCCURRENCE AND COAL DEVELOPMENT POTENTIAL MAPS OF THE CAMEL ROCK QUADRANGLE, SWEETWATER COUNTY, WYOMING

(Report includes 13 plates)

By

Walter Danilchik

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INTRODUCTION

Purpose

This text is to be used in conjunction with Coal Resource Occurrence (CRO) and Coal Development Potential (CDP) Maps of the Camel Rock Quadrangle, Sweetwater County, Wyoming (13 plates). This report was compiled to support the land planning work of the Bureau of Land Management to provide a systematic coal resource inventory of Federal coal lands in Known Recoverable Coal Resource Areas (KRCRA's) in the western United States.

Location

The Camel Rock 7 1/2-minute quadrangle is in the southern part of Sweetwater County, 14 mi (22.5 km) southeast of the city of Rock Springs, Wyoming.

Accessibility

Wyoming Highway 430 crosses the quadrangle; most parts of the quadrangle are accessible by unimproved roads and trails that branch laterally from the highway.

Physiography

The Camel Rock quadrangle is situated in the Southeastern part of the Rock Springs coal field in the southeastern part of the Rock Springs uplift. The vegetation of the area consists of sparse grass and patches of sage at lower elevations and groves of cedar trees along high ridges. Topographic elevations range from 6,480 ft (1975 m) above sea level in the north part of the quadrangle along Salt Wells Creek, to as much as 7,660 ft (3,335 m) on the highest of the northnortheast trending ridges in the area.

Salt Wells Creek is the principal stream; it is intermittent and flows northward.

Industries in the quadrangle are sheep and cattle ranching. There is one reported oil well in the southeast corner of the area (sec. 10, T. 16 N., R. 102 W.), but no information on its production is available.

Climate

The climate in the Camel Rock quadrangle is arid and windy. Mean annual precipitation, mostly in the form of snow, is about 9 in. (23 cm) (Root, Glass, and Lane, 1973). Temperature annually ranges between -30°F (-34°C) and 100°F (38°C). Strong westerly winds occur almost daily.

Land Status

The quadrangle is 8.6 mi (13.8 km) long, 6.5 mi (10.5 km) wide, and encompasses 55.9 mi^2 (145 km^2). It includes part of the Rock Springs Known Recoverable Coal Resource Area (KRCRA). Coal rights in Federal lands containing minable coal--in beds more than 5 ft (1.5 m) beneath less than 1,000 ft (305 m) of overburden--are federally owned only in sec. 10, T. 16 N., R. 102 W., in the southeast corner of the quadrangle (pl. 2).

GENERAL GEOLOGY

Previous Work

The southern part of the Rock Springs coal field, including this quadrangle, was mapped in 1908,by A. R. Schultz of the U.S. Geological Survey. An uncolored geologic map showing coal outcrops, at the scale of 1:250,000, on a planimetric base, was later published (Schultz, 1910, pl. 14). An unpublished, detailed geologic map of the quadrangle, on a topographic base, by H. W. Roehler, U.S. Geological Survey, Denver, Colorado, was the principal basis for this compilation.

Stratigraphy

Rocks exposed in the quadrangle are of Quaternary and Cretaceous ages. They are assigned, in descending order, to surficial deposits of alluvium that occupy stream valleys, and to the underlying Almond, Ericson, Rock Springs, and Blair Formations, and the Baxter Shale of Late Cretaceous age.

Coal beds in the area are confined to the Almond Formation. The Almond Formation is more than 800 ft (244 m) thick; it consists of gray sandstone and interbedded gray shale, gray and brown carbonaceous shale, coal, and minor thin beds of gray, limy, locally concretionary siltstone.

Coal beds in the Almond Formation were deposited in coastal swamps and lagoons that developed west of northeast-trending barrier bars during westward transgression of the Lewis sea in Late Cretaceous times (Roehler, Swanson, and Sanchez, 1977). The beds are very lenticular.

Structure

The Camel Rock quadrangle is on the southeast flank of the Rock Springs uplift, east of the southward plunge of the major anticlinal axis of the uplift. The general strike of strata is north 25° east. The rocks dip east-southeastward at angles rarely exceeding 6°. The coal-bearing rocks have not been faulted.

COAL GEOLOGY

Two coal beds having thicknesses more than 5 ft (1.5 m) were mapped from adjacent areas and identified by Roehler (1976). They are the Mallard and the Robin coal beds. The coals from these beds in this area have not been analyzed, but analyses from other places in the Rock Springs coal field indicate that these coals are subbituminous C to subbituminous A in rank. They contain less than 1 percent sulfur and average about 50 percent fixed carbon and 4 percent ash. The heating value ranges from 8,800 to 10,850 Btu/lb (20,469 to 25,237 kJ/kg) on a moist, mineral-matter-free basis (Schultz, 1910, p. 243).

The coal beds of the Almond Formation comprise a coal zone that in outcrop ranges to as much as 200 ft (61 m) in thickness and contains as many as four beds of coal in the upper part of the formation. Noncoal-bearing rocks of the coal zone consist largely of dark-gray, carbonaceous, fissile shale, gray limy siltstone, and gray fissile shale, and lenticular, commonly ferruginous and calcareous sandstone. Partings and splits are common in the Mallard and Robin coal beds.

COAL RESOURCES

Unpublished surface mapping information and coal thickness measurements were used to construct isopach and structure-contour maps of the two main coal beds in the quadrangle.

Coal resources were calculated using coal isopach maps (pls. 4 and 8). The coal-bed acreage, measured by planimeter, multiplied by the average isopached thickness of coal 5 ft (1.5 m) or more thick, times 1,770 short tons per acre-foot of subbituminous coal (13,018 metric tons/hectare-meter) yields the Reserve Base (RB) tonnage for each coal bed. Reserve Base tonnages were calculated for each reporting category (measured, indicated, and inferred) under less than 200 ft (61 m) of overburden, and for the same three categories for coal beneath more than 200 ft (61 m), but less than 1,000 ft (305 m) of overburden. Reserve Base (RB) and Reserve (R) values for the coal beds are shown on plate 12. Reserve values equal the Reserve Base times recovery factor of 0.85 for coal beneath less than 200 ft (61 m) of overburden, and times recovery factor of 0.50 for coal beneath more than 200 ft (61 m) of overburden.

Total coal Reserve Base tonnages, rounded to the nearest tenth of a million short tons, of the federally owned coal beds subject to unrestricted leasing and thicker than 5 ft (1.5 m) that lie less than 1,000 ft (305 m) beneath the ground surface are shown on plate 2. They total approximately 10 million short tons (9.1 million metric tons).

COAL DEVELOPMENT POTENTIAL

Development Potential for Surface Mining Methods

Areas where the coal beds are overlain by 200 ft (61 m) or less of overburden are considered to have potential for strip mining and were assigned a high, moderate, or low development potential, as shown on plate 13. The assignments are based on the mining-ratio—cubic yards of overburden per ton of recoverable coal—values (to convert yds^3 overburden/ton of coal to m^3 overburden/metric ton of coal, multiply by 0.842.) The formula used to calculate mining ratios is as follows:

$$MR = \frac{t_o\ (0.911)}{t_c\ (rf)}$$

where MR = Mining ratio
t_o = Thickness of overburden
t_c = Thickness of coal
rf = Recovery factor
0.911 = Factor for subbituminous coal

Areas of high, moderate, and low coal-development potential for surface mining in this quadrangle are defined as areas underlain by coal beds having mining-ratio values of 0 to 10:1 for high, 10:1 to 15:1 for moderate, and greater than 15:1 for low development potential. These mining-ratio values are shown on plates 6 and 10. The areas of high, moderate, and low development potential are based on present-day economic and technological criteria and are applicable only to this quadrangle. They were derived in consultation with J. Paul Storrs, Area Mining Supervisor, U. S. Geological Survey.

Development Potential for Underground Mining

The coal development potential for underground mining of coal is also shown on plate 13. In this quadrangle, only the Robin coal bed, where it is 5 ft (1.5 m) or more thick and is beneath more than 200 ft (61 m) of overburden, is considered to have a high potential for underground mining.

Table 1.--Strippable coal Reserve Base data for Federal coal lands (in short tons) in the Camel Rock quadrangle, Sweetwater County, Wyoming

(Development potentials are based on mining ratios (cubic yards of overburden/ton of underlying recoverable coal). To convert short tons to metric tons multiply by 0.9072; to convert mining ratios in yd^3/ton coal to m^3/t, multiply by 0.842)

Coal bed name	High development potential (0-10:1 mining ratio)	Moderate development potential (10:1-15:1 mining ratio)	Low development potential (>15:1 mining ratio)	Total Reserve Base
Mallard	610,000	250,000	540,000	1,400,000
Robin	4,700,000	1,600,000	640,000	6,940,000
TOTAL	5,310,000	1,850,000	1,180,000	8,340,000

Table 2.--Coal Reserve Base data for underground mining methods for Federal coal lands (in short tons) in the Camel Rock quadrangle, Sweetwater County,Wyoming

(To convert short tons to metric tons multiply by 0.9072)

Coal bed name	High development potential
Mallard	62,000
Robin	1,821,000
Total	1,883,000

REFERENCES

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Root, F. K., Glass, G. B., and Lane, D. W., 1973, Sweetwater County, Wyoming; Geologic map atlas and summary of economic mineral resources: Geol. Survey of Wyoming, County Resource Series, no. 2, 9 pls.

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